

*DOE/OSET International Planning Meeting*

**Mexico Renewable Energy Program  
&  
Bilateral/Trilateral Energy Cooperation  
Agreements relating to Renewable Energy**

*Presented by*

**Michael Ross**

International Renewable Energy Office

*Sandia National Laboratories*



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# Mexico Renewable Energy Program

*Sponsored by*

**U.S. Department of  
Energy (USDOE)**

*and*

**U.S. Agency for  
International  
Development  
(USAID)**

*Managed by:*  
**Sandia National  
Laboratories**



# MREP Implementation Team

- Sandia National Laboratories (SNL)
- Southwest Tech. Develop. Institute (SWTDI)
- National Renewable Energy Laboratory (NREL)
- Winrock International
- Ecoturismo y Nuevas Tecnologías (EyNT)
- Valdez Engineering
- Centro de Investigación en Energía (CIE)
- National Solar Energy Association in Mexico



# Mexico RE Program Objective

Promote the appropriate and sustainable use of RE technologies in Mexico, in order to:

- **Increase quality and reduce costs of RE technologies** (components, systems, services) by expanding markets for, and providing feedback to U.S./Mexican RE industry;
- **Increase the use of clean energy sources** to combat global climate change (reducing greenhouse gas emissions) and to protect our natural environment by limiting pollution; and
- **Increase the economic, social, and health standards** in rural, off-grid households and communities by utilizing RE systems for productive applications.



# Develop Sustainable New Markets for Renewable Energy Technologies

- **Focus on human and institutional infrastructure**
  - work with partners to develop in-country capacity
  - work with suppliers to assure technical quality of installed systems
  - work with end users to assure reasonable expectations and operation practices
  - team with industry to facilitate long-term technical partnerships with in-country suppliers.



# Apply a Diverse Approach to Implementation Programs

Based on six fundamental principals:

- Build strong **partnerships** with in-country organizations,
- Implement **pilot projects** as a way to institutionalize the use of renewable energy technologies,
- Build **technical capacity** within both demand-side and supply-side organizations,
- Provide **technical assistance** to assure project quality,
- Conduct **monitoring** to catch problems and feed information back into the system, and
- Project **replication** is the true measure of success - market growth.



# Program Highlights To Date

- **More than 400 pilot systems installed, promoting awareness and catalyzing market growth**
- **Local training and capacity building were an integral component of each pilot project**
- **Over 2,000 engineers, suppliers, users, and decision makers trained in RE technologies**
- **More than 50 renewable energy companies, both U.S. and Mexican, have participated**
- **Program integrated into the U.S./Mexico Bilateral Agreement for Energy Cooperation**
- **Commercial replication: thousands of systems purchased and installed via the private sector**



# Current Program Focus

- **Assist Mexican program partners in implementing large-scale RE replication programs**
- **Build the technical and operational capacity of partners to carryout RE based projects & programs**
- **Provide technical assistance and conduct workshop/trainings on RE technologies and applications**
- **Emphasis on applications for protected areas, agriculture, tele-education, and rural electrification**
- **Provide assistance to program partners in the support of RE policy promotion in Mexico**

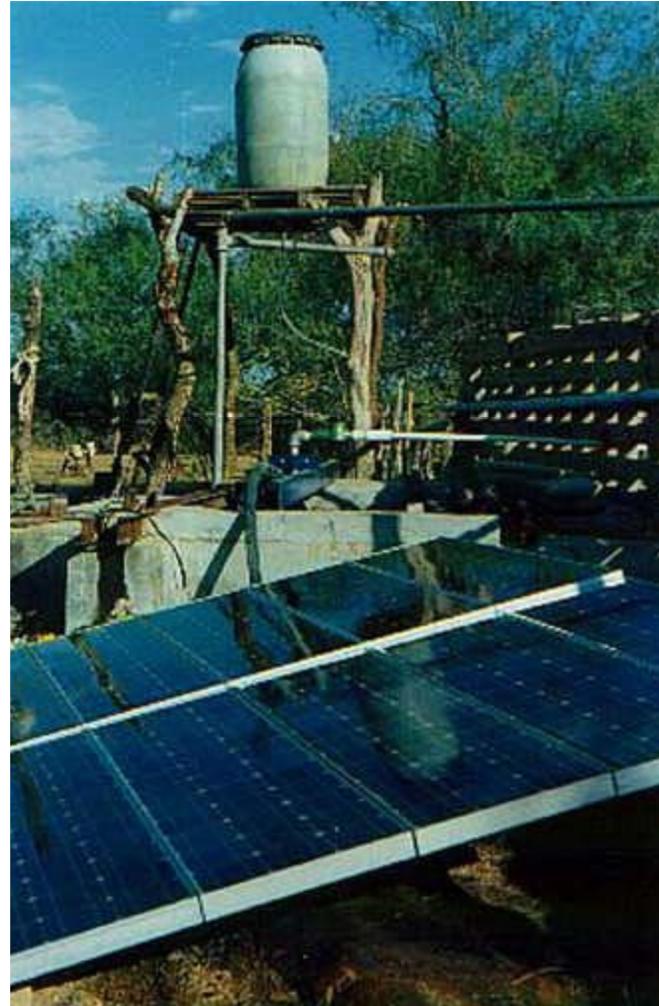


# Mexico RE Program Main Sectors

- Agriculture
  - Secretariat of Agriculture (SAGARPA)/FIRCO
- Protected Environmental Areas
  - Secretariat of Environment and Natural Resources (SEMARNAT)/CONANP
- Distance Education
  - Secretariat of Public Education (SEP)/DGTVE
- Rural Electrification
  - Secretariat of Energy (SENER)
  - National Indigenous Institute (INI)



# RE in the Agricultural Sector



# RE in the Agricultural Sector

- Fideicomiso de Riesgo Compartido (FIRCO)
  - Agricultural Extension Service under the Secretariat of Agriculture (SAGARPA)
  - Mexico RE Program (MREP) partners since 1994
- MREP provides RE tech. assistance, training, guidelines, specifications, monitoring, etc.
- More than 200 pilot cost-shared RE water pumping systems installed have led and are leading to large-scale replication



# FIRCO “RE for Agriculture Program”

- Successful partnership secured World Bank and Global Environment Facility (GEF) funding
  - \$31 million (US), four-year (2000 - 2004) program
  - 1st GEF funded RE program for agriculture
  - Started in August 2000
- Large-scale RE pilot system replication
  - 1200 PV and 55 wind water pumping systems
  - New agricultural applications (e.g. milk cooling)



# RE for Ag. Program Components Aimed at Infrastructure Development

- Promotion and Publicity
- Training
- Demonstration Projects
- Technical Assistance
- Market Development
- Vendor Financing
- Specifications/Certification

Each of these  
is based on  
public/private  
partnerships



# Secretariat of Public Education

## Distance Education



# Extending Distance Education Networks into Off-Grid Communities

- Mexican Secretariat of Public Education
  - Televised Education Office (DGTVE)
- Latin American Institute of Educational Communication (ILCE) - 13 countries
- 30,000 reception points (schools) in Mexico
  - 16,000 are *Telesecundaria* schools
- Less than 2% are off-grid
  - Diesel generators and PV systems



# Sandia Helps to Build Confidence in PV Technology as a Viable Energy Source

- Assessments on existing systems
- Technical assistance
  - technical specifications
  - technical review of bids - provide input
  - acceptance testing - system quality control
- Capacity building - training
- Provide documents for technicians, end-users, and decision makers



# Secretariat of Environment Protected Areas



# Use of RE Technologies in Protected Areas

- Mexican Secretariat of the Environment and Natural Resources (SEMARNAT)
  - National Commission for Protected Natural Areas (CONANP)
- 70 cost-shared pilot projects
  - Water pumping
  - Electrification of visitor/research/guard stations
  - Communications - park management



# Off-Grid Rural Electrification

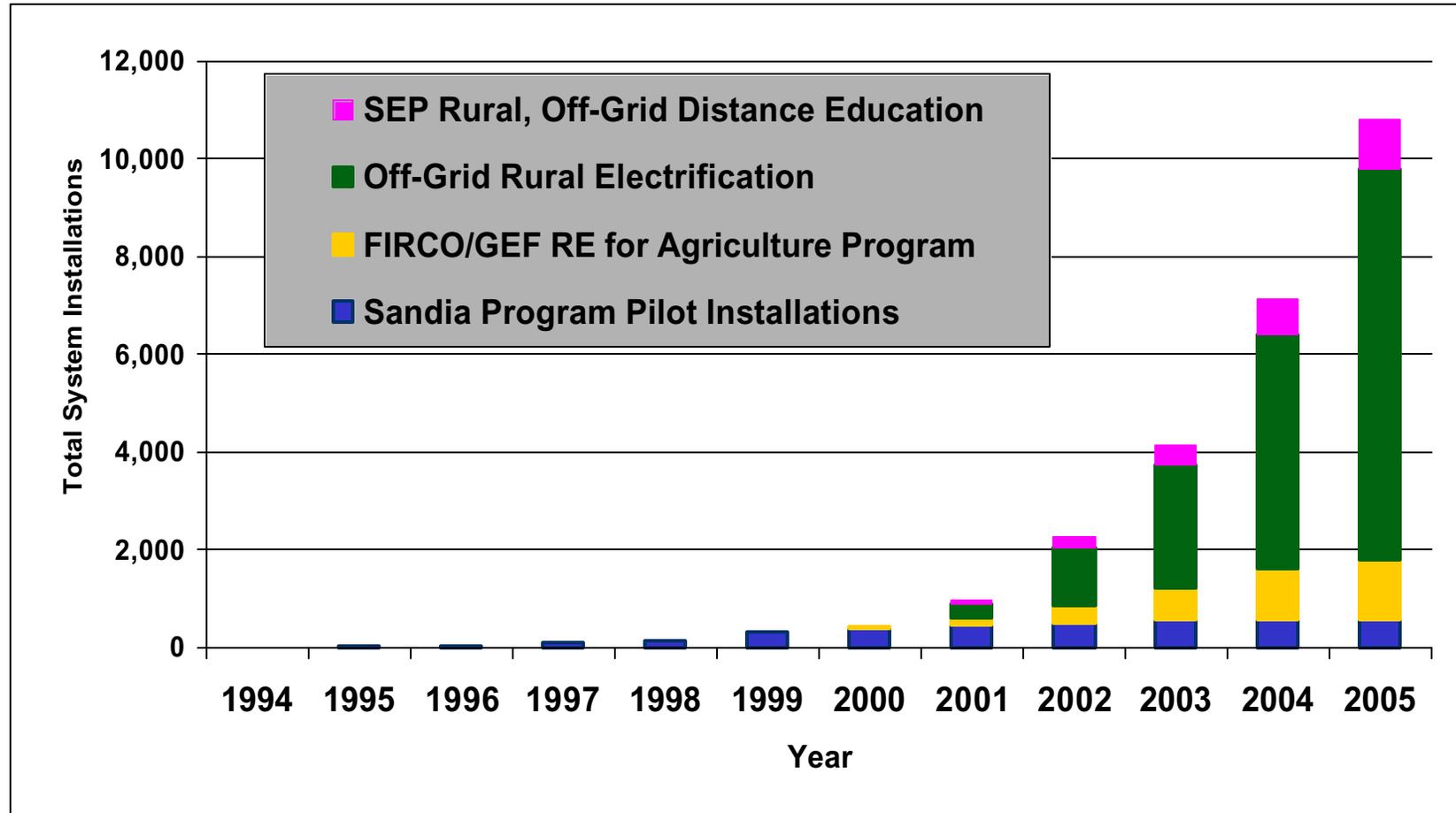


# Off-Grid Rural Electrification

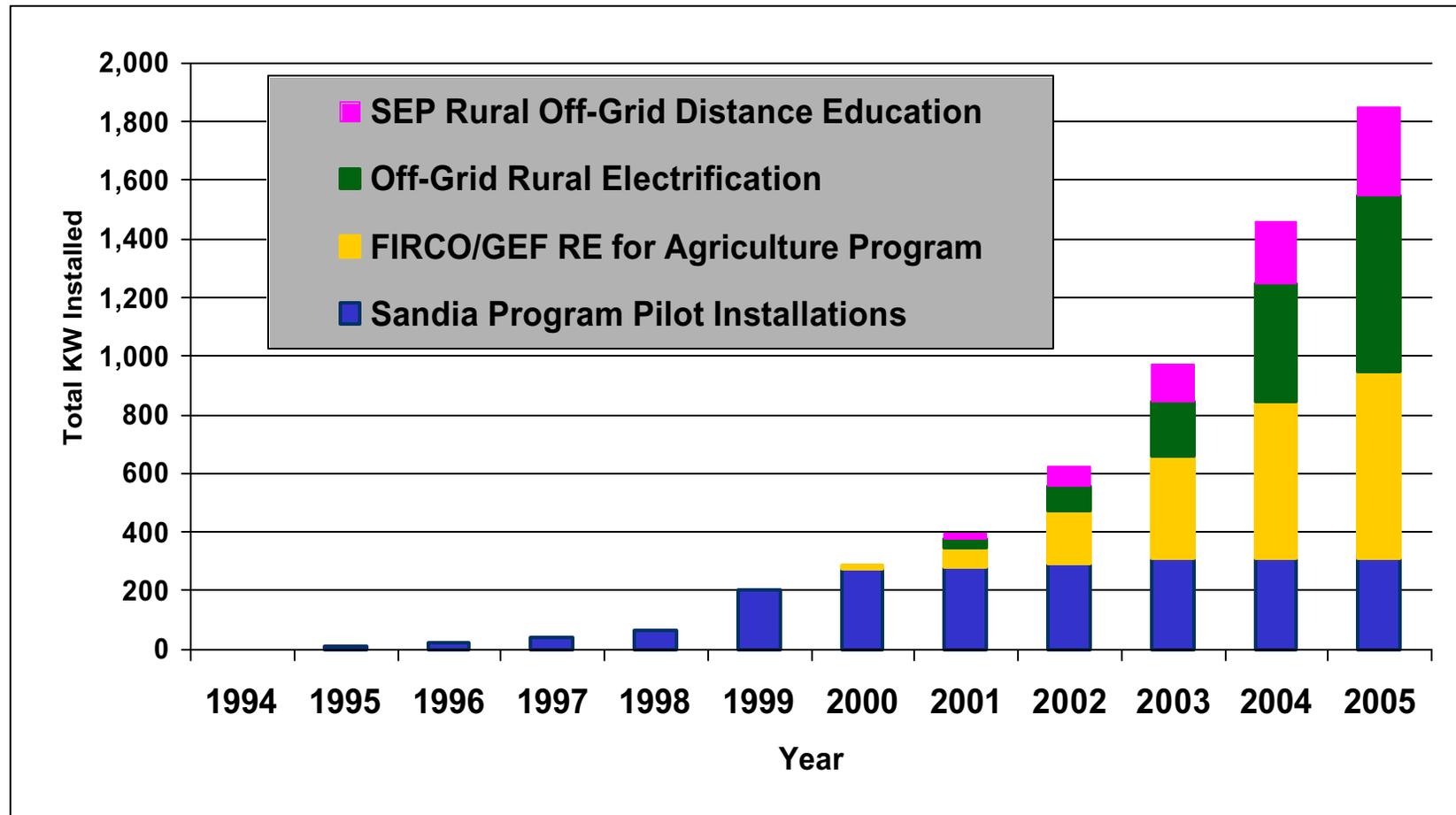
- Mexican Secretariat of Energy (SENER)
  - World Bank
  - Global Environmental Facility (GEF)
- National Indigenous Institute (INI)
  - Water and Light Initiative
- Various applications from productive-uses to social development



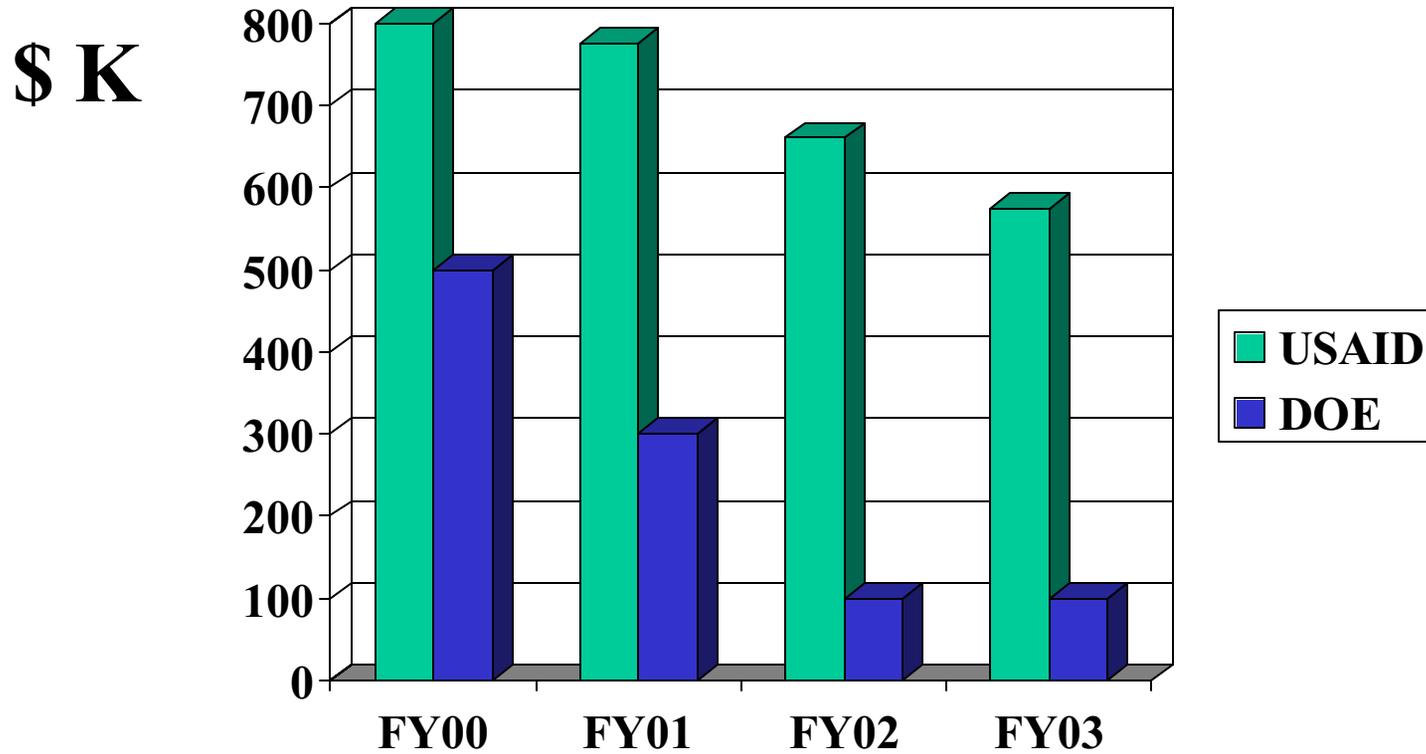
# Large-Scale System Replication by Program Partners



# Large-Scale System Replication by Program Partners



# MREP Funding Sources & Budgets



# Concluding Remarks

- USAID/Mexico's new 5-Year Strategy
  - Starts in FY04
  - RE is part of their Environmental Program
    - Solar (mainly PV)
    - Small hydro-electric (mini, micro, and pico)
    - Small wind systems
  - Clean Production and Renewable Energy
    - Pollution prevention and environmental management
  - RE focus
    - Watersheds in geographically specific areas
    - Large-scale partner implementation and replication

# Concluding Remarks

- New partners and applications in Mexico
  - SEP/DGTVE - Distance Education
  - National Indigenous Institute (INI) - Diverse Applic.
  - SEMARNAT/CONANP - Protected Areas
- New agreement (PASA or IAA) must be implemented for FY04 between DOE and USAID
- DOE interest: Office of Solar Energy Technologies & Office of Weatherization and Intergovernmental Affairs



[WWW.RE.SANDIA.GOV](http://WWW.RE.SANDIA.GOV)



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# US/Mexico Bilateral Energy Cooperation Agreement

## Status of Annex 1

## Cooperation in the Field of Renewable Energy



US Department  
of Energy

Sandia National  
Laboratories



# Annex 1 - Renewable Energy (RE)

- Cooperation started in 1998
- Extended in 2001 for 2 years - until 7 May 2003
- Comisión Nacional para el Ahorro de Energía (CONAE) - Technical Coordinator in Mexico
- Sandia National Laboratories (SNL) - Technical Coordinator in U.S.



# Annex 1 - Renewable Energy (RE)

- Joint research in RE systems, components and materials (1 activity)
- Cooperation in assessment of RE resources (2)
- Collaboration in RE training for researchers, engineers, technicians, vendors (2)
- Cooperation in programs to encourage the use of RE by public and private sectors, with provision of educational/consulting services (11)



# Annex 1 - Renewable Energy (RE)

- Most DOE sponsored activities relate to solar technologies
  - mainly photovoltaic
  - solar water heating
  - solar concentrating thermal
- USAID sponsored activities tend to relate to small systems (PV and wind) in social-economic applications
- Most activities fall under the MREP



# Annex 1 - Renewable Energy (RE)

## *Highlights*

- 16 defined cooperation activities
- >400 cost-shared demonstration projects
- >2000 engineers, technicians, users trained
- >50 US and Mexican companies participated
- \$31M RE for Agriculture Program funded
- CFE/APS Community Hybrid System installed
- Gov't and private sector replication in process



# US/Mexico/Canada Trilateral Energy Cooperation Agreement in Science and Technology



**Sandia National Laboratories**

# Trilateral Energy Cooperation

- Discussions started in March 2002
- RE is a category
- Converter Reliability and Standards is the first RE topic to be considered
- Other RE potential topics
  - fuel cells, hybrid systems, geothermal/gas advanced drilling techniques and high temperature instrumentation



# Funding for Bi- & Tri-Lateral

- FY03 - \$150k
- DOE - Office of Weatherization and Inter-Governmental Affairs

